

## WHAT IS CLAIMED IS:

1. A power monitoring apparatus which monitors a power supply for failures, comprising:

monitoring means for monitoring a voltage  
5 fluctuation range of the power supply and a duration of voltage fluctuations within the voltage fluctuation range;

determination means for looking up a power failure rank table for determining a power failure rank  
10 of the power supply on the basis of the voltage fluctuation range and the duration obtained as a monitoring result from said monitoring means to determine the power failure rank of the power supply;  
and

15 output means for outputting a power failure signal indicating the power failure rank determined by said determination means to a power supply destination of the power supply.

2. The apparatus according to claim 1, wherein the  
20 power failure rank comprises a rank defined by a predetermined voltage fluctuation range and a duration of voltage fluctuations within the predetermined voltage fluctuation range or a plurality of ranks defined by a plurality of different voltage fluctuation  
25 ranges and fluctuation durations.

3. The apparatus according to claim 1, further comprising storage means for storing the power failure

rank table.

4. An exposure apparatus which has a power monitoring apparatus which monitors a power supply for failures and projects a pattern on a first substrate onto a second substrate to expose the second substrate to the pattern using a projection optical system,
- wherein the power monitoring apparatus comprises monitoring means for monitoring a voltage fluctuation range of the power supply and a duration of voltage fluctuations within the voltage fluctuation range,
- determination means for looking up a power failure rank table for determining a power failure rank of the power supply on the basis of the voltage fluctuation range and the duration obtained as a monitoring result from said monitoring means to determine the power failure rank of the power supply, and
- output means for outputting a power failure signal indicating the power failure rank determined by said determination means to a power supply destination of the power supply, and
- the exposure apparatus comprises control means for controlling operation of units constituting the exposure apparatus on the basis of the power failure rank indicated by the power failure signal output from the power monitoring apparatus.

5. The apparatus according to claim 4, wherein said control means performs any of operation of allowing the units to continue to operate, preparation for stopping operation, stop operation which allows resumption of operation upon recovery from a power failure, and stop operation which prohibits the resumption of operation without any intervention upon recovery from a power failure, and restarts operation in accordance with stop state upon recovery from a power failure.
- 10 6. The apparatus according to claim 4, wherein said control means uses a profile for controlling operation of the units constituting the exposure apparatus to control the units.
- 15 7. The apparatus according to claim 6, wherein said control means switches from the profile to a power failure profile on the basis of a power failure signal output from the power monitoring apparatus and uses the power failure profile to control the units.
- 20 8. The apparatus according to claim 6, wherein one of the units constituting the exposure apparatus comprises an actuator, and said control means performs stop operation by switching from a profile of the actuator in operation to a stop profile, stop operation at a point in time when acceleration of the actuator becomes zero, or stop operation without servo control
- 25 on the basis of a power failure signal output from the power monitoring apparatus and restarts exposure

operation upon recovery from a power failure.

9. An exposure apparatus which has a plurality of power monitoring apparatuses which monitor a power supply for failures and projects a pattern on a first substrate onto a second substrate to expose the second substrate to the pattern using a projection optical system,

wherein units constituting the exposure apparatus are divided into unit groups, and each of the plurality of power monitoring apparatuses monitors power supply state of each unit group,

each power monitoring apparatus comprises monitoring means for monitoring a voltage fluctuation range of the power supply and a duration of voltage fluctuations within the voltage fluctuation range,

determination means for looking up a power failure rank table for determining a power failure rank of the power supply on the basis of the voltage fluctuation range and the duration obtained as a monitoring result from said monitoring means to determine the power failure rank of the power supply, and

output means for outputting a power failure signal indicating the power failure rank determined by said determination means to a power supply destination of the power supply, and

the exposure apparatus comprises

control means for controlling operation of the unit groups on the basis of the power failure rank indicated by power failure signals output from the plurality of power monitoring apparatuses.

10. The apparatus according to claim 9, wherein said control means performs for each unit group any of operation of allowing the units in each unit group to continue to operate, preparation for stopping operation, stop operation which allows resumption of operation upon recovery from a power failure, and stop operation which prohibits the resumption of operation without any intervention upon recovery from a power failure, and restarts operation in accordance with stop state upon recovery from a power failure.

11. The apparatus according to claim 9, wherein said control means uses a profile for controlling operation of the units constituting the exposure apparatus to control the units.

12. The apparatus according to claim 11, wherein said control means switches from the profile to a power failure profile on the basis of a power failure signal output from the power monitoring apparatus and uses the power failure profile to control the units.

13. The apparatus according to claim 11, wherein one of the units constituting the exposure apparatus comprises an actuator, and said control means performs

stop operation by switching from a profile of the actuator in operation to a stop profile, stop operation at a point in time when acceleration of the actuator becomes zero, or stop operation without servo control  
5 on the basis of a power failure signal output from the power monitoring apparatus and restarts exposure operation upon recovery from a power failure.

14. A semiconductor device manufacturing method of manufacturing a semiconductor device using an exposure  
10 apparatus which projects a pattern on a first substrate onto a second substrate to expose the second substrate to the pattern using a projection optical system, comprising:

an application step of applying a photosensitive  
15 agent to the second substrate;

an exposing step of exposing the second substrate by the exposure apparatus; and

a development step of developing the exposed second substrate,

20 wherein the exposure apparatus comprises a power monitoring apparatus which monitors a power supply for failures and

control means for controlling operation of units constituting the exposure apparatus on the basis of a  
25 power failure rank indicated by a power failure signal output from the power monitoring apparatus, and

the power monitoring apparatus comprises

monitoring means for monitoring a voltage fluctuation range of the power supply and a duration of voltage fluctuations within the voltage fluctuation range,

5           determination means for looking up a power failure rank table for determining a power failure rank of the power supply on the basis of the voltage fluctuation range and the duration obtained as a monitoring result from the monitoring means to  
10   determine the power failure rank of the power supply, and

          output means for outputting a power failure signal indicating the power failure rank determined by the determination means to a power supply destination  
15   of the power supply.

15.   A semiconductor device manufacturing method of manufacturing a semiconductor device using an exposure apparatus which projects a pattern on a first substrate onto a second substrate to expose the second substrate  
20   to the pattern using a projection optical system, comprising:

          an application step of applying a photosensitive agent to the second substrate;

          an exposing step of exposing the second substrate  
25   by the exposure apparatus; and

          a development step of developing the exposed second substrate,

wherein the exposure apparatus comprises  
a plurality of power monitoring apparatuses which  
monitor a power supply for failures and  
control means for controlling operation of unit  
5 groups into which units constituting the exposure  
apparatus are divided, on the basis of a power failure  
rank indicated by a power failure signal output from  
each of the plurality of power monitoring apparatuses,  
each of the plurality of power monitoring  
10 apparatuses monitors power supply state of each unit  
group, and  
each power monitoring apparatus comprises  
monitoring means for monitoring a voltage  
fluctuation range of the power supply and a duration of  
15 voltage fluctuations within the voltage fluctuation  
range,  
determination means for looking up a power  
failure rank table for determining a power failure rank  
of the power supply on the basis of the voltage  
20 fluctuation range and the duration obtained as a  
monitoring result from the monitoring means to  
determine the power failure rank of the power supply,  
and  
output means for outputting a power failure  
25 signal indicating the power failure rank determined by  
the determination means to a power supply destination  
of the power supply.

16. A method of controlling a power monitoring apparatus which monitors a power supply for failures, comprising:

a monitoring step of monitoring a voltage fluctuation range of the power supply and a duration of voltage fluctuations within the voltage fluctuation range,

a determination step of looking up a power failure rank table for determining a power failure rank of the power supply on the basis of the voltage fluctuation range and the duration obtained as a monitoring result in the monitoring step to determine the power failure rank of the power supply, and

an output step of outputting a power failure signal indicating the power failure rank determined in the determination step to a power supply destination of the power supply.

17. A program for controlling a power monitoring apparatus which monitors a power supply for failures, comprising:

a program code for a monitoring step of monitoring a voltage fluctuation range of the power supply and a duration of voltage fluctuations within the voltage fluctuation range,

a program code for a determination step of looking up a power failure rank table for determining a power failure rank of the power supply on the basis of

the voltage fluctuation range and the duration obtained as a monitoring result in the monitoring step to determine the power failure rank of the power supply, and

- 5           a program code for an output step of outputting a power failure signal indicating the power failure rank determined in the determination step to a power supply destination of the power supply.